CLAIMS

1. A method for rapidly cooling metal parts using a pressurized cooling gas, characterized in that the cooling gas comprises one or a plurality of gases absorbing infrared radiation, selected so as to improve the heat transfer to the part by combining radiative and convective heat transfer phenomena, so as to improve the convective heat transfer coefficient in comparison with conventional conditions of cooling under nitrogen.

2. The cooling method as claimed in claim 1, characterized in that the cooling gas also comprises an additive gas selected from helium, hydrogen or mixtures thereof.

3. The cooling method as claimed in claim 1 or 2, characterized in that the cooling gas further comprises a supplementary gas.

4. The cooling method as claimed in one of claims 2 or 3, characterized in that the composition of the cooling gas is also adjusted so as to obtain an average density of the cooling gas thus produced which is approximately the same as that of nitrogen.

5. The cooling method as claimed in one of claims 2 to 4, characterized in that the composition of the cooling gas is also adjusted so as to optimize the convective heat transfer coefficient in comparison with the convective heat transfer coefficients of each of the components of the cooling gas considered individually.

6. The cooling method as claimed in either of claims 2 and 3, characterized in that the cooling operation is carried out in a vessel in which the parts to be treated are disposed, the vessel being equipped with a gas stirring system, and in that the composition of the cooling gas is also adjusted so as to obtain an average density of the cooling gas thus produced which is adapted to said stirring system of the vessel,

without the need to make significant changes to said vessel.

7. The cooling method as claimed in one of claims 2 to 6, characterized in that the composition of the cooling gas is also adjusted so that, during the parts cooling phase, endothermic chemical reactions can occur between the absorbent gas or one of the absorbent gases and another of the components of the cooling gas.

8. The cooling method as claimed in one of the preceding claims, characterized in that said infrared absorbing gas is CO_2.

9. The cooling method as claimed in one of claims 1 to 7, characterized in that said infrared absorbing gas is selected from the group formed of saturated or unsaturated hydrocarbons, CO, H_2O, NH_3, NO, N_2O, NO_2, and mixtures thereof.

10. The cooling method as claimed in one of the preceding claims, characterized in that the proportion of absorbent gas in the cooling gas is between 5 and 100%, and preferably between 20 and 80%.

11. The cooling method as claimed in one of the preceding claims, characterized in that the cooling gas is a binary CO_2/He mixture, of which the CO_2 content is between 30 and 80%.

12. The cooling method as claimed in one of claims 1 to 9, characterized in that the cooling gas is a binary CO_2/H_2 mixture, of which the CO_2 content is between 30 and 60%.

13. The cooling method as claimed in one of the preceding claims, characterized in that an operation of recycling of the cooling gas is carried out after use, suitable for recompressing the gas before a subsequent use, and, as required, also for separating and/or purifying it, thereby to recover all or part of the components of the cooling gas.

14. The use, in an installation for rapidly cooling metal parts using a pressurized cooling gas, which installation is optimized for operation with nitrogen, of a cooling gas comprising from 20 to 80% of

an infrared absorbing gas and from 80 to 20% of hydrogen or helium or mixtures thereof, the composition of the cooling gas being adjusted so as to make significant changes to the installation unnecessary.